

Measurement and Verification of Demand Resources in New England's Forward Capacity Market

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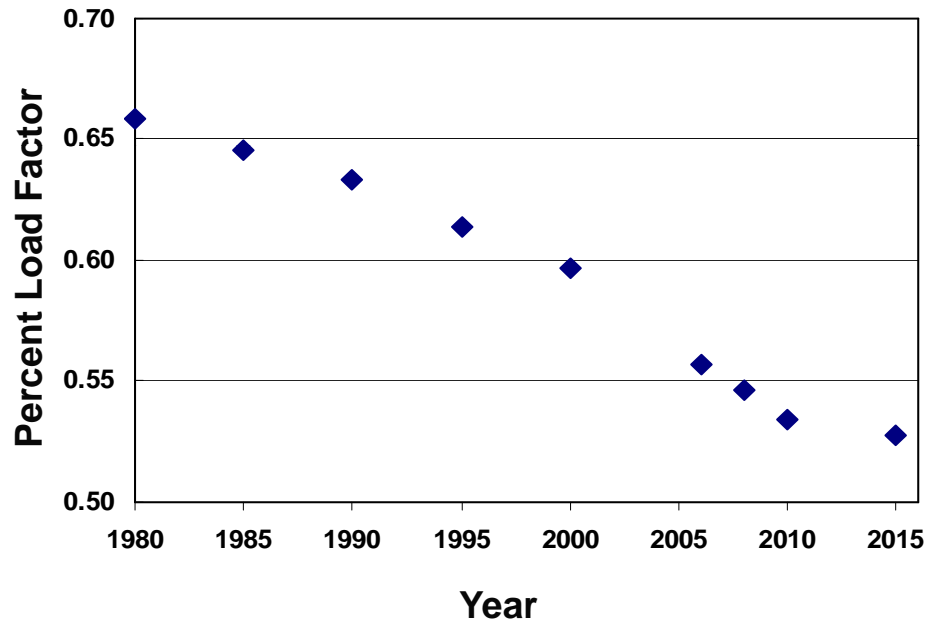
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Demand Participation in Markets is Needed

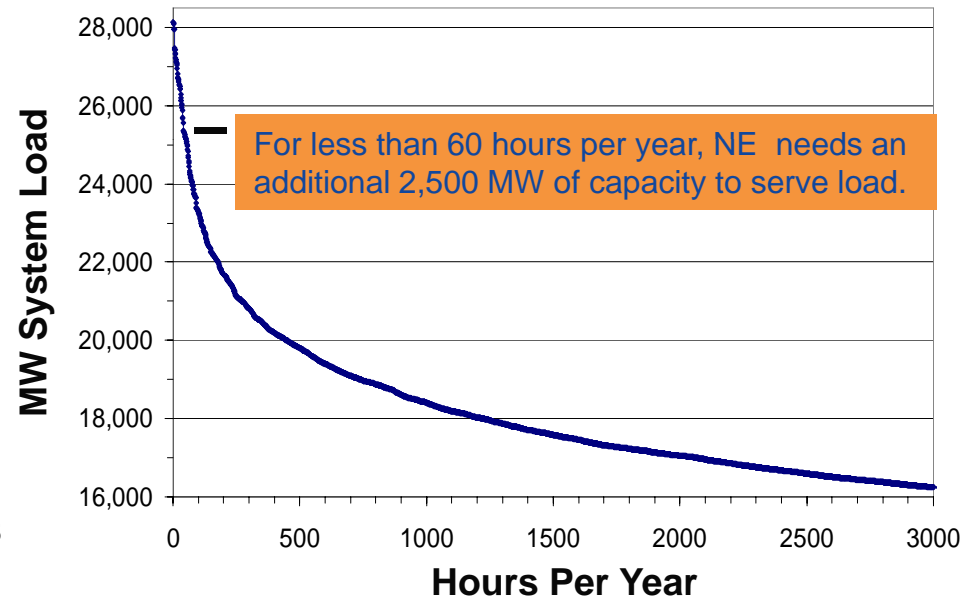
- A small amount of demand participation in markets can go a long way in mitigating peaks, lowering costs, and ultimately lowering electricity prices to final consumers.
- The load factor of the New England electricity system has been steadily declining over time resulting in:
 - Peaky loads, higher energy and capacity costs, and higher average rates.
- Markets are the most efficient way to encourage the development of cost-effective Demand Resources.
- Used Stakeholder Process to develop M&V requirements incorporating comments from Energy Service Companies, Utility Program Managers, and State Regulatory Officials.

System Utilization Declining - Peak

ISO Summer Peak Load Factors History 1980-2006, Forecast 2007-2016



New England Load Duration Curve (2006)



New Demand Resources Qualified for FCA #1

MW by Load Zone and Demand Resource Type

Load Zone	Resource Type					Grand Total
	Critical Peak	On-Peak	Real-Time Demand Response	Real-Time Emergency Generation	Seasonal Peak	
Connecticut	101.1	53.8	137.0	175.5	129.4	596.8
Maine	23.3	27.8	148.8	37.0		236.9
NEMA	114.8	133.3	137.0	148.4	7.2	540.7
New Hampshire	13.6	32.2	34.7	48.7	3.4	132.6
Rhode Island	7.7	39.5	56.2	93.7	1.6	198.7
SEMA	87.2	78.3	88.4	92.8	2.4	349.1
Vermont	7.6	56.6	16.8	18.8	0.8	100.6
WCMA	36.5	68.1	117.8	99.0	15.0	336.4
Grand Total	391.8	489.5	736.6	714.0	159.9	2491.8

Note: Qualified Capacity (MW) includes T&D and Reserve Margin gross up, mandatory de-list for Summer vs. Winter capacity differences, and effects of Composite Offers.

Demand Resources by Measure Type

Non Dispatchable

Dispatchable

LOAD ZONE	DG Fossil	DG Renewable	Energy Efficiency	Load Management and RTDR	RTEG	Total
CONNECTICUT	19.6	0.0	161.1	240.7	175.5	596.8
MAINE	0.0	0.0	27.8	172.1	37.0	236.9
NEMASSBOST	0.0	0.0	133.3	259.0	148.4	540.7
NEWHAMPSHIRE	7.0	0.0	32.2	51.7	48.7	139.6
RHODEISLAND	0.0	0.0	39.5	65.5	93.7	198.7
SEMASS	5.6	0.2	72.5	178.0	92.8	349.1
VERMONT	0.0	0.0	56.6	25.3	18.8	100.6
WCMASS	12.6	0.0	67.1	157.6	99.0	336.4
Grand Total	44.8	0.2	590.2	1149.7	714.0	2498.8

Note: Qualified Capacity (MW) includes T&D and Reserve Margin gross up, mandatory de-list for Summer vs. Winter capacity differences, and effects of Composite Offers.

Demand Resource Performance

- The Forward Capacity Market rules were developed to recognize:
 - Differences among Demand Resource types, and
 - The needs of the system in meeting Installed Capacity Requirements.
- Different Demand Resource technologies – i.e., Energy Efficiency, Load Management, and Distributed Generation – reduce load in different ways.
 - Passive versus active (i.e., dispatchable)
 - Weather sensitivity
 - Demand reduction versus energy output
- Demand Resources must reduce load so as to reduce the need for generation capacity.
 - Five Demand Resource types were defined, each with a specific set of performance hours. Reduced load during such performance hours would reduce the need for generation capacity.
 - On-Peak, Seasonal Peak, Critical Peak, RTDR, RTEG

Qualification Process Overview

- New Demand Resources must make two major information submittals:
- **Show of Interest Application**
 - Contains sufficient information to perform preliminary analysis of the effect of the proposal on the New England system, and to schedule ISO resources to review Qualification Packages.
- **Qualification Package**
 - Contains sufficient information to assess the viability of the project.
 - Measurement & Verification Plan
 - Customer Acquisition Plan
 - Project Description
 - Source of Funding
 - Critical Path Schedule
 - Capacity Commitment Period Election
 - Intention to Offer Below 75% of the Cost of New Entry
 - Consistency with Show of Interest Form

Demand Resources Need Measurement and Verification Plans

- All Demand Resources that participate in the Forward Capacity Market are required to demonstrate performance during specified performance hours in a manner that provides electrical capacity to the New England Control Area.
- To qualify for the Forward Capacity Market, Demand Resources must have an ISO-NE-approved Measurement and Verification Plan that complies with the applicable Measurement and Verification standards.
- The measured and verified electrical energy reductions during performance hours are the basis of capacity payments to Demand Resources participating in the Forward Capacity Market.

M&V Highlights and Challenges

- Qualification, Testing, Auditing
 - Market design requires forecasting performance 3 years in advance.
 - Current data systems do not have ISO-NE auditing processes.
- Data Reporting – Frequency and Monitoring
 - Reporting Requirements are Complex (Near Real-Time and After the Fact).
 - Impacts on Operations and Planning
 - Systems are not built yet for tracking data.
 - VEE standards
- Meter and Equipment Standards
 - Balance cost with precision and accuracy requirements
 - Non-metered loads

M-MVDR: http://www.iso-ne.com/rules_proceeds/isone_mnls/index.html

M&V Challenges (continued)

- Performance Baseline
 - New or Replacement of Existing measures
 - Use of State Code, Federal Efficiency Standards or Standard Practice
 - Pre and Post installation measurements
 - Capacity factors
 - Seasonality
- Statistical Sampling of non-interval metered loads
 - Use of minimum statistical Precision and Accuracy requirement
 - Population variation control
 - Control of Bias
 - Sampling methodology (survey vs analytical measurements.)